

It is gratifying to find a writer on sociology acquainted with modern mathematical methods of statistics, and one who clearly recognises the value of such methods, but the definitions given in Chapter iii. of the introduction require some rewording. The word "number" on p. 21 is apparently used in the sense of "magnitude of the variable" instead of in the more natural sense of "frequency," but even in this sense it would not be correct to define the median as "the number midway between the lowest and highest"; it is correctly defined by the statement that magnitudes greater and less than the median occur with equal frequency, so that the median will not in general coincide with the middle of the observed range. Again, it is hardly correct to speak of a measure of variation as the "mode of the deviation"; mode is used in the sense of "most frequent value," and the most frequent deviations in the case of symmetrical distributions will be those approximating to zero. The term "standard deviation" was defined by Prof. Pearson, its introducer, in the sense of root-mean-square deviation, and it is apt to lead to misunderstanding if used in a vague sense, as in the text. The section on the "law of sympathy," pp. 108-110, would also be the better for, at least, some additional explanation; it is from its curtness almost incomprehensible as it stands, and some of the symbols used appear to be only defined in the appendix.

The book is suggestive of many possible lines of research by means of indirect statistical index-numbers, but we cannot help feeling that the author has tried to cover ground too wide for a single volume. The work as it stands is so abstract that it is almost impossible to estimate the practical value of the author's ideas, and such abstractness alienates the sympathy of the statistician. A much more liberal discussion of examples in the text would be both valuable and refreshing.

G. U. Y.

Optical Lanterns and Accessories. Edited by Paul N. Hasluck. Pp. 160. (London: Cassell and Co., Ltd., 1901.)

THIS handbook forms one of a series of practical manuals, and it brings together the more important and useful information in relation to the construction and management of optical lanterns. For the main part the editor has utilised material which has been published from time to time in the weekly journal *Work*, and has coordinated it in such a form that it will be found very serviceable to those who have much to do with lanterns. There are also chapters on the making of ordinary photographic, coloured and mechanical lantern slides, and some useful hints regarding the management of kinematographs. The book is well illustrated and should be found very handy.

Plane Geometrical Drawing, including numerous Exercises and Army Examination Papers, with Solutions. By R. C. Fawdry, M.A. Pp. xi+185. (London: E. and F. N. Spon, Ltd., 1901.) Price 6s. net.

THIS is a work of quite an elementary character, and very well suited to candidates for admission to Woolwich and Sandhurst. A good feature of the book is that it either gives a proof for each construction or refers to the particular proposition of Euclid on which the construction is founded. In addition to constructions relating to right lines, triangles, polygons and circles, there is a short chapter on the ellipse, which, in a second edition, might very well include a treatment of the parabola, inasmuch as the parabola is at once one of the simplest and the most useful of curves in the applications of mathematics. There are two good chapters on the use and construction of scales, and the book concludes with several specimens of papers set in the subject at the Woolwich and Sandhurst examinations, together with the solutions of the questions.

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LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

The "Chestnuts" of the Horse.

THESE structures are well known and have been variously interpreted. But I believe that a suggestion as to their nature which I shall now put forward has not yet been made. Some months since I called attention in this Journal (vol. lxii. p. 523) to the general prevalence among mammals that use their fore limbs as grasping or climbing organs—in fact, in all other ways excepting as mere organs of progression—of a tuft of long hairs upon the wrist. I have since that time examined a large number of mammals, and find these vibrissæ in a considerable number of genera belonging to the orders Marsupialia, Rodentia, Carnivora, Lemuroidea (in which latter group the vibrissæ in question were first noted by Mr. Bland Sutton). They are absent from the Ungulata with the exception of hyrax, an admittedly ancient type of ungulate. Usually, but not always, a stout branch of the radial nerve of short extent ends in this patch of integument which bears the vibrissæ. The vibrissæ are quite similar to those found upon the head of the same mammals, for example the "whiskers" of the cat. The general occurrence of this carpal tactile (?) organ makes it, at least on *a priori* grounds, reasonable to suppose that traces might be met with in the ungulates, other than hyrax, where it unquestionably exists. There might not at first sight appear to be much in common between the callous pad, such as is the "chestnut" of the horses and asses, and this tuft of vibrissæ; but the conditions which I found to obtain in an armadillo (*Dasypus villosus*) suggested the comparison. In that animal the carpal tuft of vibrissæ is present; but instead of being a closely compacted tuft of about six hairs, as is usually the case, the hairs in the armadillo are not much larger than those of the skin generally, and are spread over a patch of integument of about half an inch in length and are more numerous. The patch of skin which bears them is thickened. If this were to proceed further the more strongly cornified epidermis would cease to bear vibrissæ, which would be, so to speak, driven into a corner beyond the specially thickened tract of skin. This stage, moreover, is not hypothetical; for in *Lemur catta* precisely this state of affairs exists, *i.e.*, a callous tract of skin close to which is a tuft of vibrissæ. If the latter were lost we should have the "chestnut" of the horse. The chestnuts on the fore feet, he it observed, occupy the right position, a little above the wrist.

FRANK E. BEDDARD.

Frost Patterns.

AS I was responsible for opening the discussion in these columns in 1892 and as I am able to confirm Dr. Catherine Raisin's observation as to the recent recurrence of the phenomenon on December 15, I am glad of the present opportunity of sending a few lines on the same subject in order to rectify an omission. In 1873 Prof. Joseph Henry, of the Smithsonian Institution, Washington, forwarded to Prof. Tyndall on behalf of Prof. Lockett, of the Louisiana State University, a beautiful photograph of "plumes produced by the crystallisation of water," the said pattern having been formed in the coloured sediment in the bottom of a basin in which the water had frozen during the night. This photograph is reproduced as a plate in Tyndall's "Lectures on Light" (I have only the second edition, 1875). It escaped my notice during the correspondence in 1892 or I should certainly have called attention to it.

R. MELDOLA.

Roads and National Welfare.

IN NATURE of December 19, 1901 (p. 149) is given a criticism of a work, in which some essential points in the making and maintenance of roads are strongly insisted on. At p. 156 of the same number there appears an excellent commentary on Mr. Balfour's speech to the students of the Goldsmiths' Institute at New Cross on December 12. With your comments I am in thorough sympathy, and would beg leave to point out that the two subjects are far more closely connected than might at first appear. Excellence and superiority

in manufactures and commerce depends on very many elements, as you know, one of the most important of which is the "item" "carriage or transport." British superiority in many manufactures and markets has depended, and will henceforth largely depend, on that one item principally (take the case of iron ores), and to maintain superiority it must receive in the immediate future more careful attention and scientific treatment. Roads in their different forms enter largely as factors into the general question of "transport," and if trade superiority is to be maintained they must be looked after and treated, all over these countries, in a more scientific and skilled manner than that now prevalent in the United Kingdom. For that end there must be attained, as soon as possible, uniformity of make, treatment and control, and the highest efficiency as regards care and maintenance, and to ensure these results they should be placed under the charge of a body of trained engineers, such as those of the "ponts et chaussées" of France. The question to a certain extent resembles that of the currency of the realm, and as there is a perfectly uniform coinage for every part of it, so should the make and use of the roads be of one standard all over the kingdom, in the best interests of all who travel or convey goods. The Board of Trade controls the railways, why not a Board or Department for the roads? and thus obviate the many absurd and scandalous practices which exist and are allowed to prevail, to the great discomfort and loss of the community. Allow me to give my experience of what is taking place in the township of Pembroke (Dublin). The road "metal" mostly in use is simply the coarser riddlings from the drift gravel so abundantly and cheaply worked in the neighbourhood of the Town Hall. The stones, perfectly rounded, incapable of taking bond and largely composed of entirely rotten elements, are loosely thrown here and there, where prominent holes appear. Mr. Beete Jukes, the former head of the Geological Survey of Ireland, remarked when he saw the material used, that boiled potatoes might as well be employed, and the rapid wear fully bears out the correctness of this judgment, and hence a large staff of scavengers and carts, discomfort for all classes of road-users, and steady increase of rates. In a southern county I have seen the road surface worn into the form of the section of an inverted arch, and was informed by a competent authority that the county surveyor, a Whitworth scholar, secured the place as the result of a Civil Service examination, the pay being about 800*l.* per annum, and thus secured, proceeded to develop a private practice as civil engineer, leaving the roads to attend to themselves. Many other examples of this nature might be given. As to the importance of good roads from a military point of view, it should be unnecessary for me to refer to it. I see from time to time the Dublin garrison companies and battalions out on marching exercise and notice the dragged appearance in which the men come home when the weather is in any way moist or rainy, and reasonably associate this condition with the bad state of the roads about Dublin. The Romans certainly knew better on this branch of military engineering, and might still be copied. As for agriculture, the Americans have gone thoroughly and systematically into the question, and are taking effective measures to put their road systems into a proper working state, and to have them kept up to it. I trust, Sir, that you will excuse these rather extended observations and that you will see your way to urging the pressing importance of a uniform and general system of road making and maintenance for the kingdom on the grounds of high State utility, commercial importance and agricultural necessity.

J. P. O'REILLY.

Dublin, December 28, 1901.

Preoccupied Names in Zoology.

THIS afternoon I spent a little more than half an hour over the "Zoological Record" for 1899, looking for preoccupied generic names proposed in that year. The result was as follows:—

Baris, Loos, for a plathelminth in the alimentary canal of *Chelonia* is untenable because of Baris, Germ., a genus of beetles.

Astia, Loos, for a worm in gut of *Tetrodon*; *nec* Astia, Koch, an arachnid.

Brotella, Roverto, new name for *Acrostoma*, which was preoccupied; *nec* Brotella, Kaup, in fishes.

Cumopsis, Roverto, new name for *Cuma*, Humph., preoccupied; *nec* Cumopsis, Sars, Crustacea.

Eichwaldia, Smitt, new subgenus of *Gobius*; *nec* *Eichwaldia*, Bill., Mollusca.

Goniopsis, Melichar, new genus of Fulgoridæ; *nec* Goniopsis, Haan, Crustacea.

Halticella, Jacoby, new genus of beetles; *nec* Halticella, Spinola, Hymenoptera.

Xenus, Péringuey, new genus of beetles; *nec* Xenus, Kaup, in birds.

I left off with the feeling that by taking time such instances could be multiplied almost indefinitely!

This is a condition of affairs which is becoming intolerable. None of the authors of the above names had even taken the trouble to consult the "Nomenclator Zoologicus." Such names become current for a number of years, until someone happens to discover that they have been used before. The result is an inconvenient though necessary change and a useless synonym. Sometimes authors will not even correct these errors of nomenclature when their attention is directed to them, and if they do propose a substitute there is no telling whether it will be valid.

Would it be practicable for some representative body, such, for instance, as the staff of contributors to the "Zoological Record," to examine every new generic name proposed and issue from time to time a list of substitutes for names found untenable? Or, if it were preferred, the author in each case could be asked to propose a substitute, and then all the substituted names could be given in an appendix to the "Zoological Record." Whatever is done, it seems necessary that these errors should be promptly corrected, and equally plain that this cannot be left to the unaided intelligence of authors.

T. D. A. COCKERELL.

East Las Vegas, New Mexico, U.S.A., December 16, 1901.

A Luminous Centipede.

MR. R. I. POCKOCK, to whom I sent the subjoined extract from notes made by me on June 5, 1897, has suggested that the observation would be of interest to readers of NATURE. He remarks: "The two new facts you have observed—namely, the defensive purpose of the substance and its irritating properties—are, I think, sufficiently important to put upon record." The notes are as follows:—

"Under the entrance gate, in the gravel, I saw a light of a brilliant greenish-bluish tint; it moved forward, leaving behind a trail of light which, gradually separating, became a scattered mass of brilliant points. The leading light had the form of a living, curving thread. A lighted match soon showed what the scattered points of light in its trail were, a dozen or so of red ants pursuing the *Geophilus*; one was clinging to it, each ant shone like a spark in the gravel, the centipede had discharged its fluid over them. I picked up the centipede and dropped it into a tumbler, where it splashed out a mass of light. Hurriedly placing my hand over the tumbler to prevent the insect from escaping, I felt suddenly a strange prickly sensation such as is caused by a slight contact with electricity, so that I hastily removed my hand, calling to a friend who, placing her hand over the tumbler, felt the same thing.

"I lit another match and watched the *Geophilus* writhe the light out of its body in blue-green flashes. It soon ceased to shine, having probably exhausted all the luminosity on its enemies.

"Defence seems certainly to be one of the uses of this secretion, attributed by some authors merely to purposes of attraction.

ROSE HAIG THOMAS.

"The White House, Basildon, Reading."

The New Planetoid.

THE note on Prof. Pickering's announcement of the discovery of a new planetoid moving in a very elliptic orbit, in the Astronomical Column of your issue of December 19, 1901, was read by me with much interest.

I should, however, like to point out that the orbit of the new planetoid is not the most elliptic yet known, that place being held, I believe, by *Æthra* (183), for which ϕ amounts to $22^{\circ} 32'$ (Watson's orbit), while for the new planetoid ϕ is $22^{\circ} 8'$.

Andromache (179) might also be included among those for which ϕ exceeds 20° , in addition to the two named in the note—Eva and Istria, its excentricity being 0.348 (Watson).

S. B. GAYTHORPE.

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